

WHAT IS CLAIMED IS:

1. A cerium based composite oxide comprising:

0.1 to 50 mol% of at least one metal selected from the group consisting of yttrium, scandium, and rare earth elements excluding cerium and promethium, in term of oxides, and

50 to 99.9 mol% of cerium in terms of oxides,

wherein said composite oxide is in a form of acicular primary particles having an average aspect ratio

(length/width) of 1.05 to 10.0.

2. A cerium based composite oxide in a form of secondary particles consisting of aggregates of primary particles of claim 1, and having an average aspect ratio of 5.0 to 40.0.

3. A cerium based composite oxide comprising primary particles of claim 1 and secondary particles of claim 2, and having a BET specific surface area of 5 to 40 m²/g, an average particle size of 0.1 to 0.5 μm, and a particle size distribution expressed by a particle size distribution index represented by the formula (1) of not higher than 1.6:

Particle Size Distribution Index

$$= (D84-D16)/(2 \times D50) \dots (1)$$

wherein D16, D50, and D84 each stands for an accumulated particle size of top 16%, 50%, and 84% particles from the

finest.

4. A method for preparing cerium based composite oxide of claim 3 comprising the steps of:

5 (A) adding alkali to a cerium salt-containing mixed solution containing 0.1 to 50 mol% salt of at least one metal selected from the group consisting of yttrium, scandium, and rare earth elements excluding cerium and promethium and 50 to 99.9 mol% cerium salt to obtain a
10 precipitate slurry of cerium based composite salt,

(B) introducing 0.1 to 1.0 mol carbonate ions per 1 mol of rare earth elements in the precipitate slurry, and heat-treating said precipitate slurry under atmospheric pressure at 40 to 100 °C to prepare precipitate of carbonate
15 ion-containing cerium based composite salt,

(C) calcining said precipitate at 600 to 1000 °C to obtain calcined powders, and

(D) grinding said calcined powders.

20 5. The method of claim 4, wherein a total concentration of said cerium salt and said salt of at least one metal selected from the group consisting of yttrium, scandium, and rare earth elements excluding cerium and promethium in said cerium salt-containing mixed solution in step (A)
25 is 0.1 to 1.0 mol/L, and

wherein said alkali in step (A) is in a form of an aqueous solution at a concentration of 0.3 to 2.0 mol/L.

6. A green compact molded by pressing a composite oxide of claim 3.

5 7. The green compact of claim 7, wherein said compact completes shrinkage by heating at a heating rate of 5 °C/min up to 1300 °C.

8. A sintered product of a green compact of claim 6, having
10 a relative sintering density of not lower than 99 %, and an average grain size of primary grains in the sintered product of 0.8 to 3.0 µm.

9. A method of producing a sintered product of claim 8
15 comprising sintering a green compact of claim 6 at 1150 to 1400 °C.